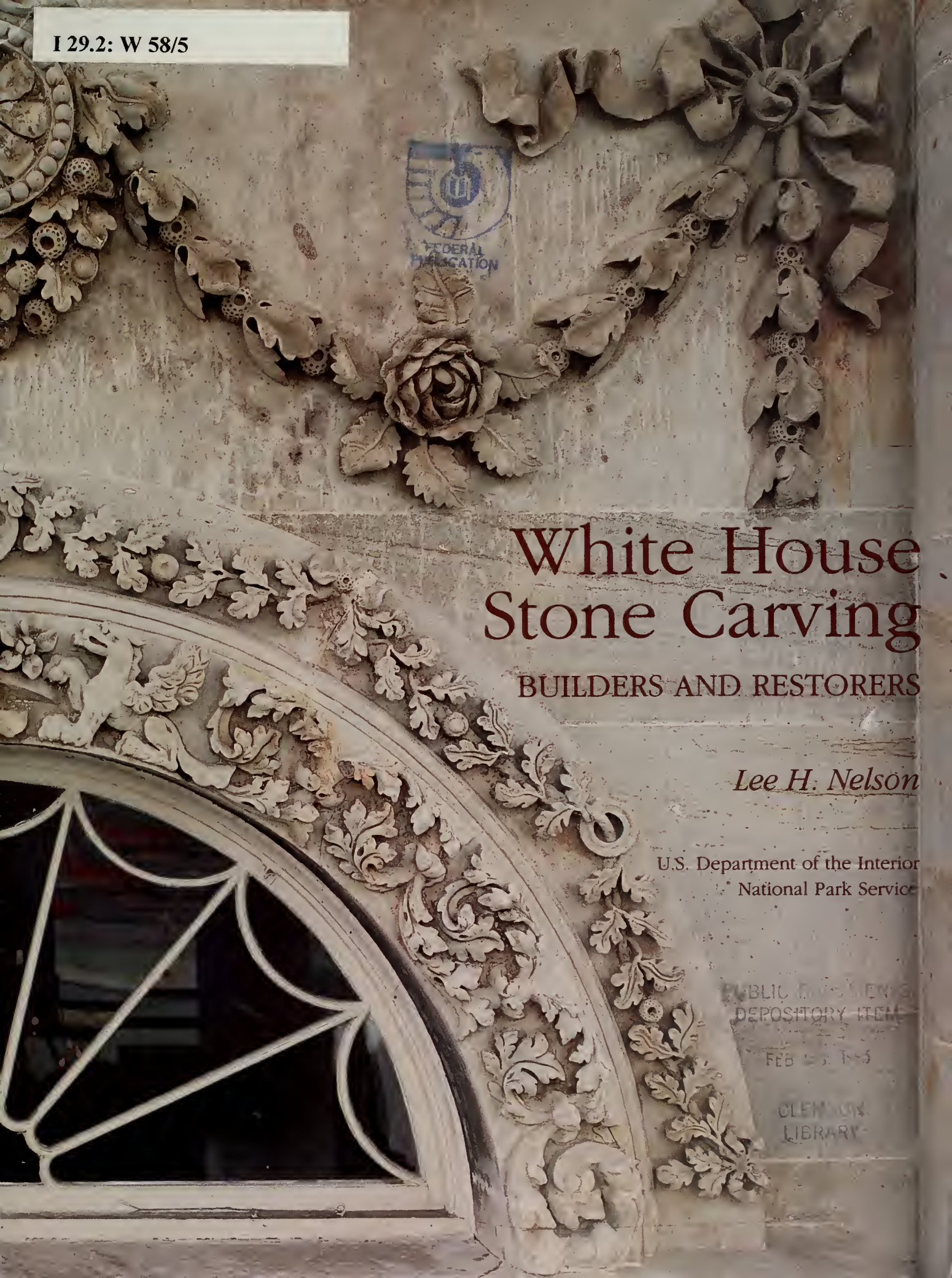
I 29.2: W 58/5



White House Stone Carving

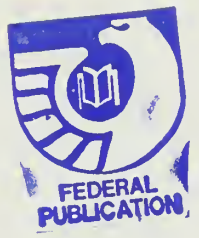
BUILDERS AND RESTORERS

Lee H. Nelson

U.S. Department of the Interior
National Park Service

FEDERAL DEPOSITORY
PUBLIC DOCUMENTS
DEPOSITORY ITEM
FEB
CLEMSON
LIBRARY

Cover *Ornate carving of the transom and swags over the north entrance to the White House represents the quality craftsmanship of the original stonemasons and the finest American stone carving from the late 18th century. photo: Richard Cheek.*



White House Stone Carving

BUILDERS AND RESTORERS

Lee H. Nelson, F.A.I.A.

U.S. Department of the Interior
National Park Service
National Capital Region
White House Liaison

U.S. Department of the Interior
National Park Service
Cultural Resources
Preservation Assistance Division

1992

Printed in the United States of America

U.S. Department of the Interior
National Park Service
Preservation Assistance Division
P.O. Box 37127
Washington, D.C. 20038

Library of Congress Cataloging-in-Publication Data

Nelson, Lee H.
White House stone carving: builders and restorers/by Lee H. Nelson.
p. cm.
Includes bibliographical references.
ISBN 0-16-038014-6 : $4.25
1. Stone carving — Washington (D.C.) — History — 18th century.
2. Decoration and ornament, Architectural — Washington (D.C.)
3. Stone carving — Conservation and restoration — Washington (D.C.)
4. White House (Washington, D.C.) I. Title.

NK8700.5.U62W26 1992
725'.17'09753 — dc20 92-21388
CIP

Design by Charles Beyl, Alexandria, Virginia
Drawings by Tim Buehner, National Park Service

Cover photograph by William Allman, The White House

For sale by the U.S. Government Printing Office.
Superintent of Documents,
Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-038014-6

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-038014-6

Foreword

The White House is the finest eighteenth century stone house in the United States, yet one of its most significant features has been hidden from view throughout the twentieth century. Beneath the many coats of white paint applied over the years are details of the original stone carvers' wonderful craftsmanship. Now, after 200 years, the paint has been removed and the stonework repaired as part of an overall exterior restoration of this incomparable unit of our National Park System.

The removal of as many as 40 layers of deteriorated paint has made it much easier today to appreciate the superb workmanship of the eighteenth-century carvers. Beyond the carvings themselves, the enormous task of building a magnificent stone structure along the banks of the Potomac River is a truly remarkable story, a tribute to the vision of our founding fathers and to the craftsmen who realized that vision.

As the office and home of the President of the United States and a historic site visited by more than one million people annually, the White House is unique in the world. And though the stone craft practiced at the White House is just a small part of its rich past, the care and pride of the original stone carvers is being respectfully extended by today's restorers.

With the White House Chief Usher, the National Park Service shares stewardship responsibility for the grounds and extérior of the building. We are pleased to offer both national and international visitors educational programs and publications that will help foster a greater appreciation and understanding of this national treasure. This booklet not only tells the story of the stone masons' achievements in the eighteenth century, it describes the significant work being done by today's talented restoration team.

Director
National Park Service

Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

http://archive.org/details/whitehousestonec00nels

Preface

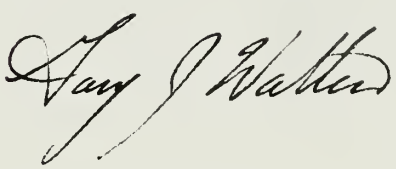
As one of the most recognizable buildings in the world, the White House is both a symbol of freedom and a representation of America to peoples throughout the world. Today, two hundred years after the laying of the cornerstone, craftsmen are at work restoring the exterior sandstone walls of the White House. As a result, the exquisite eighteenth-century carvings and tooled stone faces, long hidden under numerous layers of paint coatings, can be fully appreciated.

The exterior restoration project has provided an opportunity to study the intricately carved stones and investigate the original stone carving and quarrying procedures. The laborious task of quarrying, handling, sizing, carving, and placing the thousands of stones that weighed as much as 1½ tons was a remarkable accomplishment, especially in the late 1700s in America.

In keeping with the long tradition of maintaining the historical character of the original stone walls, the project aims to minimize the loss of the original stone, replacing only what is necessary. Small pieces of matching Aquia creek sandstone, quarried at the same time and from the same quarry as the White House stone, are used to repair larger stones that are severely cracked, weathered, or damaged.

We are fortunate to have a marvelous restoration team, dedicated to progressing with infinite care and displaying many of the skills reflected in the original stonework craftsmanship. The complexity of the project is further complicated because it must be scheduled around the daily tours totaling 1.25 million visitors each year, as well as the Official and Ceremonial events of the Presidency. Despite the slow and laborious pace of the work and the accompanying noise and dust, the stone restoration effort has received strong support from the First Families.

Upon completion of the exterior restoration project, the White House will be ready to face the next two hundred years as the continuing beacon of freedom admired around the world. The stone will be restored to its former architectural grandeur so that the White House can be fully appreciated by future generations as the home and office of the President of the United States.



White House Chief Usher

Acknowledgements

This publication was developed by the Preservation Assistance Division of the National Park Service in cooperation with the Chief Usher of the White House, Gary J. Walters, and the National Park Service White House Liaison Office, James T. McDaniel, Associate Regional Director, National Capital Region.

Charles E. Fisher, Historian for the Preservation Assistance Division, acted as the publication project director. It was through his commitment, interest, and guidance that the success of this publication was assured.

Lee H. Nelson, FAIA, former Chief of the Preservation Assistance Division, is an advisor on the White House Exterior Restoration Project and author of this publication. The text is based in part upon the research notes and writings of William Seale, author of *The President's House*. Special appreciation is extended to Mr. Seale for sharing the notes in his files and for his insightful review.

Timothy A. Buehner, Historical Architect in the Preservation Assistance Division, worked with the exterior restoration team and provided invaluable assistance at every stage of the publication's development including his work on the sketches, drawings, and photographs. He is also responsible for much of the research on the Aquia Creek sandstone quarries.

Patrick J. Plunkett, master stone carver and mason, is the superintendent for the present crew of stone carvers. His knowledge of the stone cutting craft is crucial to the restoration effort. The stone cutters of his crew are recognized for their fine work and cooperation during the field research for this publication. They are: Sean P. Callahan, Raymond D. Cleland, David J. Roberts, P. Andrew Uhl, and Norman L. Hickson.

The White House Curator's Office, in particular William G. Allman, was most helpful in making photograph and data files available to enhance this publication.

Several people in the National Park Service are to be credited with various aspects of this publication. Michael T. Summerlin of the White House Liaison Office; Robert J. Kapsch, Chief of HABS/HAER Division; Jack E. Boucher and Frederick J. Lindstrom, HABS; Michael J. Auer and other members of the Preservation Assistance Division provided valuable assistance.

Thanks are also extended to Thomas H. Rudder for sharing his knowledge and expertise regarding the removal of the numerous paint coatings from the sandstone walls.

Finally, the United States Congress is acknowledged for having both the foresight and desire to insure that the White House be preserved for all Americans by providing the funds necessary for the White House Exterior Restoration Project.

Painting done about 1827 showing the White House and grounds. The Huntington Library, San Marino, California.

White House Stone Carving

BUILDERS AND RESTORERS

Americans tend to think of the White House as a symbol of the Presidency rather than an exceptional example of early American craftsmanship. Yet, when seen close-up, the building is both bold and delicate in a way that surprises and impresses most visitors—surprises because such delicate ornamentation is carved out of stone, and impresses because such craftsmanship adds a new dimension to our appreciation of the White House as a landmark building. While a number of stories can be told about building the President's House in the 1790s, this story is limited to what it took to carve a stone building, and the preservation of that work as part of the White House's 200th anniversary.

The construction of the President's Palace, or the President's House as it came to be called, was placed in the hands of three Commissioners appointed by President George Washington. Their job was to plan the work, secure cost estimates, find the necessary materials and workmen, pay the bills and be responsible for the timeliness and the costs of the project. These three Commissioners—Judge Thomas Johnson, David Stuart, and Daniel Carroll, all distinguished men—were accountable to President Washington, who took a strong personal interest in the project. Though the government was seated in Philadelphia during the ten years (1790-1800) the Federal city was being built, the President was kept well informed of the progress and made demands upon the Commissioners. Even though he knew that the next President, not himself, would be the first to occupy the Palace, President Washington carried out his own vision for the building, one which would be appropriate to the new nation. He wanted it to be large, and built of stone, rather than mere wood or brick. The construction of a large stone building along the Potomac River, where there was no established stone industry, would create almost insurmountable problems, plaguing the Commissioners for years.

The Commissioners had much more than the stonework to manage, for there were many other duties associated with building the Federal city. But overseeing just the stonework for the two most important buildings, the White House and the United States Capitol, was a formidable task. Much more was involved than just ordering materials from local suppliers and engaging local craftsmen, for neither suppliers nor craftsmen were available to the Commissioners in the new Federal city. Knowing only that the building was to be large and made of stone,

they took steps to get the work underway even though no actual plans existed and no architect had yet been selected.

The Stone Problem

In the late eighteenth century, large cities such as Boston, Philadelphia, and New York had established stone industries, utilizing local or regional stone quarries, with the necessary infrastructure to freight the rough or cut stone by land or water. In Philadelphia, there was a variety of local stone types to choose from, including marble in a range of colors. Such stones were used in a variety of ways, including fine architectural stonework cut for decorative features such as door and window trim, staircases, classical columns, and fireplace mantels. Furthermore, stone carving was a well-established craft. No such large-scale craft or industry, however, existed in or near the newly created District of Columbia. Much of the stone used for architectural trim on eighteenth-century buildings in Virginia and Maryland had been pre-carved and imported from England, such as Purbeck or Portland stone. It would have been relatively easy to build of brick, as there was a plentiful supply of good clay—but the President wanted stone.

The magnitude of the task—to build a large public building of stone—must have been evident to all concerned. Three options existed for obtaining the stone. The first was to import it from England. This was probably unthinkable for a building symbolic of a new nation that had just broken away from England. Alternatively, stone could have been ordered from one of the larger American cities, but the logistics of this option were formidable. The third possibility was to engage one of the small local quarries that supplied stone for tombstones and building trim. The Commissioners exercised the last option, though it is doubtful they really knew the size of the job ahead.

There were outcroppings of stone along the Potomac River that had been utilized for many years, but never on a large scale. One of these outcroppings was along Aquia Creek, some forty miles south of the newly created District of Columbia. The Aquia stone was selected by the Commissioners for both the White House and the United States Capitol. They chose this stone primarily because the quarries were served by water transportation, making the stone relatively accessible to the building sites in Washington. Even though it was unclear whether sufficient Aquia stone could be obtained to meet their expectations, they purchased a quarry and began to extract stone for the foundation walls of the White House. This work commenced prior to the preparation of architectural designs or drawings.

The Aquia Creek Stone Quarries

The Aquia Creek sandstone used for the White House was commonly known as a freestone, meaning a stone that can be worked freely in any direction because the grain or bedding layers are not sufficiently pronounced to interfere with the splitting, cutting or carving of the stone. In the geologic time chart, this stone resulted from the deposition of sediments along the coastal plain in the Lower Cretaceous age over 100 million years ago. It is principally composed of quartz sand, with pebbles and pellets of clay, all cemented together with silica. This stone is easy to cut and to carve because of the soft cementation. Unfortunately, this softness also contributes to poor weathering. The quality of the stone will vary even within the same quarry due to the amount of cementation present, to flaws such as the clay deposits and pebbles, and to minute cracks that are sometimes hard to detect until the stone is cut or carved. In color, the Aquia stone ranges from a tawny white to a soft pink with vibrant streaks of rust caused by mineral deposits.

Aquia stone was being quarried from several locations in Stafford County, Virginia. Small quarries situated on a 15-acre island astride Aquia Creek would eventually supply most of the stone for the President's Palace. Surrounded by tidal marshes and virtually invisible today due to the overgrowth of vegetation and trees, the exposed stone faces on the island must have been rather prominent in their heyday when quarrying was underway. Although the Aquia Creek is quite wide at this point, it is also very shallow. Only at high tide could ships load the rough-cut stone

blocks and transport them down the creek to the Potomac River. From there they could sail upriver to the new city.

The island had been acquired in the 1670s by George Brent, and it remained in the Brent family for generations. Another George Brent, a descendant, deeded the land to the Commissioners in February, 1792. The extent of the quarrying operations at that time is not known, though local buildings are known to have had Aquia stone as decorative trim. Presumably, the Brents had opened the several small quarries sufficiently that both the quantity and quality of the stone was evident to the Commissioners. To develop the quarrying operation for the Federal city, however, the Commissioners needed a much larger operation, requiring additional labor, equipment, and transportation.

A Scotsman Takes Over

In April of 1792, a Scottish master mason named Collen Williamson was contracted to serve as overseer. His duties were two-fold. In Stafford County, he was to develop and expand the modest operation at the quarry in order to provide a large and reliable stone supply for shipment to the Federal city. In Washington, he was to supervise the laying of the quarried stone for the foundations of the building, once the exact site

Fig. 1 *Aerial view of* Government Island, *site of several quarries that furnished stone for the White House. Located along Aquia Creek in Stafford County, Virginia, about forty miles south of Washington, D.C., this tidal* island *is connected to the mainland by marshy bogs and a man-made causeway. The present overgrowth conceals what was a rather extensive quarrying operation in the 1790s. After quarrying, the blocks of stone were hauled to a dock, seen here jutting out on the left edge of the island, where they were loaded onto boats, then floated down Aquia Creek to the Potomac River and shipped upriver to Washington. Thousands of tons of stone were quarried and shipped from this island for the White House in the early 1790s. photo: Jack Boucher, NPS Historic American Buildings Survey (HABS).*

and design of the building were established. Without an architect or a final design for the White House, it was all rather chaotic at this stage.

Collen Williamson seems to have been the right man for the job, at least initially. Sixty-five years of age, he was an experienced master mason from the village of Dyke, in northeastern Scotland. Coming from a family of stone masons, he was accustomed to operating as a master builder in the traditional meaning of the term. Why he came to the United States at that point in his life is not known, but it was probably for the same economic difficulties that led other skilled craftsmen to migrate to America during the next several years.

It was likely that Williamson took over a sporadic quarrying operation with relatively low production. The few quarrymen at Aquia could not begin to deal with the needed quantity of stone. Initially, the order from Pierre Charles L'Enfant (then in charge of laying out the city and its principal buildings) called for 99,000 cubic feet, or over eleven million pounds of stone just to build the foundation walls! That was roughly twice the amount finally needed, but L'Enfant had envisioned a much bigger building than was subsequently built. To begin this enormous task, the Commissioners hired "twenty five able bodied negro men Slaves to be employed at the quarries." Williamson had to teach the slaves the task of quarrying. The names of these quarry workmen have gone unrecorded. We only know that they were allowed a diet of pork and bread, with a daily ration of one pint of whiskey for each man. Working the stone would be a long and arduous task, continuing through the long hot summer days and the frozen winter months.

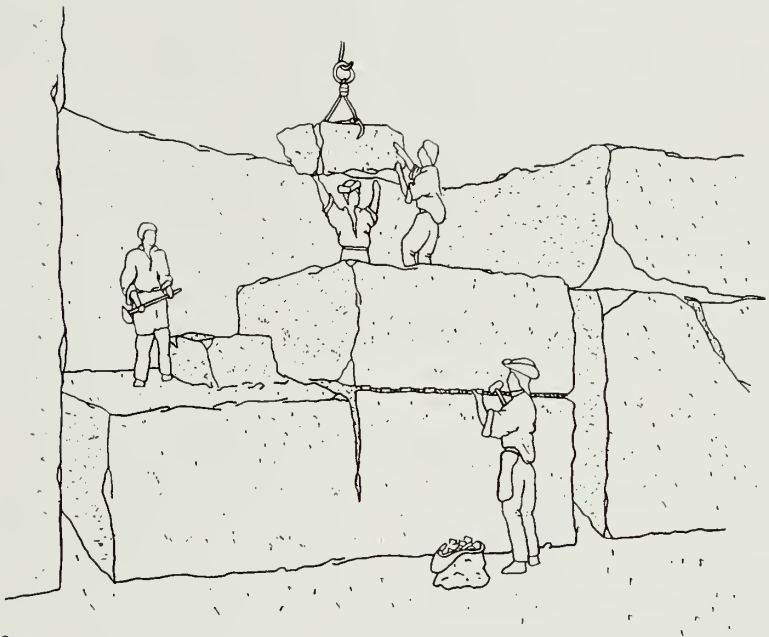
Quarrying The Stone

Williamson's task was to continue the quarrying operation on the island in Aquia Creek, but on a much larger scale. Vegetation had to be cleared away to expose new stone surfaces. Usually, the upper reaches of the exposed stone were of little use because the stone was damaged by vegetation, tree roots, and the continual splitting and heaving caused by frost over time. Using considerable labor, the damaged stone surfaces were cleared away and discarded. When it appeared that they had reached good stone, the quarriers used very labor-intensive techniques to free relatively large blocks of stone. First, they chiseled (actually picked) a vertical face on an outcropping of the stone which would serve as a working plane from which they could measure and begin to plan the removal of blocks of stone. Using hand-picks, they then cut two trenches four to six feet deep into the stone, perpendicular to the face of the stone and roughly ten to twenty feet apart. To minimize waste, these trenches were only about twenty inches wide, providing barely enough room for a man to work with a pick and cut a relatively smooth surface on each side of the trench. Then a rear trench was cut behind and parallel to the initial stone face, and it connected the two side trenches. This last trench effectively created a very large rectangular mass of stone that could be split into manageable sizes.

The quarriers then chiseled shallow horizontal and vertical grooves one to two inches wide between the trenches in the face of the stone. These grooves provided a plane from which stone blocks could be wedged away from the main mass of stone. The location of these grooves or cutting planes depended upon the presence of veins or other flaws within the stone itself, as well as the specific size of stone needed. The operation required considerable judgement and experience. To split the stone away, a number of iron wedges were placed in the grooves about one foot apart and systematically and uniformly driven into the grooves, splitting the large block into the desired size. It was a very slow process, involving a tremendous amount of hard physical labor.

As soon as the stones were split into manageable sizes, they were moved from the immediate quarry area on the island. Derricks or cranes were placed where needed to help lift out the blocks of stone that had been split away. These cranes probably consisted of large wooden posts set into holes cut in the undisturbed stone to support and steady the posts. They were equipped with large wooden pulleys with hemp ropes to provide leverage so the quarry men could lift blocks of stone and set them in an adjacent work area where the stones could be further cut and dressed into the approximate sizes required for the White House.

To reduce handling problems and to eliminate



2a

2b

2c

Fig. 2 *a) The Aquia Creek stone quarry showing the original method of removing stone. After a rock outcropping was exposed, a vertical face was created by laborers using handpicks. Three narrow trenches were then hand-picked into the rock, two at right angles to the first face and a trench parallel with the front face connecting the side trenches and isolating large sections of stone. To free the stone, horizontal and vertical grooves were chiseled into the faces of the stone. Iron wedges were then driven into these grooves to split out smaller blocks. These smaller blocks were hoisted from the immediate work area and later trimmed at the quarry into the sizes needed for the building.*

b) This photo shows an Aquia Creek quarry face *with side trenches and a horizontal groove ready for splitting, but abandoned many years ago.*

c) Closer view showing the hand-picked face of stone with a narrow chiseled groove. illustration and photos: Tim Buehner, NPS.

unnecessary wastage later when the stone was delivered and worked at the job site, the final quarry blocks were not much larger than what was ultimately needed. However, a great deal of waste occurred at the quarry. Obvious flaws had to be cut from the stone. The trenching process also created debris, as did the process of cutting the rough blocks down to the approximate sizes needed by the stone carvers.

Weight and handling were factors of major importance. Each cubic foot of stone weighed about 120 pounds. As a result, each stone that was quarried for use in the walls above the foundation was ordered in dimensions corresponding to a specific use, such as for the wall, cornice, balustrade or other location. The dimensions specified for delivery of stone from the quarry were only slightly larger than actually required, reducing weight for shipping and handling while allowing for final trimming at the site.

After the blocks were cut at the quarry to the approximate dimensions, each was marked with identifying letters and numbers, and then probably hoisted onto wood sleds and dragged by teams of oxen down the hill to the stone loading dock at the northeast corner of the island. There they would be loaded by crane onto small ships for shipment down the Aquia Creek and up the Potomac River, some 40 miles to the Federal city. Three sailing ships, the *Columbia*, the *Ark*, and the *Sincerity*, were used to transport the stone. Each was capable of carrying more than 30 tons of stone.

Millions of pounds of stone blocks thus were laboriously split out of the quarry for the White House, cut to useful sizes, dragged to the water's edge, loaded onto a barge or boat, sailed to Washington, unloaded, and hauled to the stonecutter's workshop at the building site, only to be handled several more times before they were finally placed into the walls.

Laying The Cornerstone

Before any stone carving could get underway at the White House, there were two problems that had to be resolved. First, there had to be a design for the President's House with drawings that would show the appearance, the details and the dimensions. Second, highly skilled stone masons needed to be brought to the Federal city if this house were to be built of stone. The first problem was more easily resolved than the second.

Thomas Jefferson, then Secretary of State and future President, had a life-long interest in architecture and strongly believed that the best way to get a distinguished design was to hold a competition, a practice that was little used in this country but which was common in Europe. Jefferson drafted newspaper announcements for two competitions, one for the Capitol and one for the President's House, and obtained approval from President Washington. Dated March 14, 1792 and published in the country's major newspapers, the announced competition called for entries to be submitted before the fifteenth of July and noted that there was a prize of $500 or a medal of that value for the winning entry.

James Hoban won the design competition for the President's House. Born and educated in Ireland, he was working at that time as a house carpenter in Charleston, South Carolina. For his award, Hoban selected a gold medal and took the remainder of the $500 prize in cash. Unfortunately, Hoban's original drawings and design have not survived. Hoban subsequently modified the winning entry in order to meet the expectations and demands of President Washington and the Commissioners. Pleased with their choice, the Commissioners awarded Hoban the job of directing the entire construction process.

On August 2, 1792, President Washington came to the District of Columbia, surveyed the foundations, and drove the final stakes for construction. Excavations for the basement and part of the foundations for a much larger house had already begun under the orders of Pierre L'Enfant, who was locating the major buildings and laying out the city. It is not known how much of these early foundations were built or what changes were needed to comply with the adjusted siting, but the work of laying the foundation stones, already delivered to the site from the quarry, was far enough along to arrange for an elaborate event to mark the "Laying of the Cornerstone."

This event took place on a Saturday, the 13th day of October, 1792, beginning with a parade. Starting in Georgetown, the Commissioners and Freemasons led

all the various workmen, commonly called artificers, to the foundations of the President's House where they formally placed the cornerstone. Although its precise location has never been found, a newspaper account of the ceremony reported that the cornerstone was laid at the southwest corner of the building. An inscribed brass plate was embedded with wet mortar onto the top surface of the stone. The inscription was as follows:

> This first stone of the President's House
> was laid the 13th day of October 1792, and
> in the seventeenth year of the indepen-
> dence of the United States of America.
> George Washington, *President*
> Thomas Johnson,
> Doctor Stewart [*sic*],
> Daniel Carroll,
> *Commissioners*
> James Hoban, *Architect*
> Collen Williamson, *Master Mason*
> Vivat Republica

After the ceremonies, the group marched back to Georgetown where they celebrated with an elegant dinner replete with 16 toasts honoring every conceivable interest of the participants. Ironically, the cornerstone ceremony had taken place even though the final design of the house was still unsettled.

Besides a stone supply, which was difficult to get in sufficient quantities, and the continuing revisions in the building plans, the Commissioners faced an additional problem that prevented work from proceeding very far. Few stone carvers were available to carry out Hoban's elaborate design; this was, after all, an embellished stone building, one of the first in the land.

Though the Commissioners had made earlier futile attempts to lure stoneworkers away from good jobs in Philadelphia, New York and Boston, they now had to expand their search and follow up on earlier efforts to obtain skilled labor from abroad.

In January of 1793, the Commissioners sent letters to contacts in Great Britain, France and Holland inquiring about tradesmen, including stonecutters. With war in Europe, this was not an opportune time to travel to North America due to the risk of sea travel. Efforts to attract skilled stone masons continued throughout 1793. Meanwhile, master stone mason Collen Williamson proceeded with work at the White House utilizing the few stonecutters he had and the additional laborers that could be trained. Despite the difficult work conditions and pressing schedule, Williamson's crew did a very credible job, as evident from the finished stonework on the ground floor. All the stones except for the bold projecting window enframements were neatly dressed with hand-tooled vertical furrows covering their entire surface.

The Carvers From Scotland

By eighteenth-century standards, the White House was to be a very large building, measuring 87 feet wide, 170 feet long, and 53 feet in height, with foundations five feet deep and walls constructed of quarry-faced blocks of Aquia stone. While it was intended to be an all-stone building, only the exterior walls of the ground story were constructed all in stone, over four feet thick. Due to cost constraints in 1793, President Washington approved a one story height reduction and the Commissioners declared that the exterior walls on the upper two stories would be brick with a stone facing, instead of all stone. Yet even these masonry walls were quite an achievement, measuring three feet in thickness.

The magnitude of the project perhaps can be best understood by realizing that each of the many thousands of stones in the outside walls had to be cut, dressed, handled and laid in place. Even more impressive, they average roughly three feet long, one foot high and one foot deep, weighing about 360 pounds. Some wall stones are even twice this length and weight.

Given the quality of the stonework on the ground floor of the President's House, it is unfortunate that we know nothing about Collen Williamson's crew at that stage of the work. About all we know is that Williamson claimed to have started the work on the 8th of April, 1793, and had it completed by the 7th of August of the following year—an impressive accomplishment.

The ground floor was entirely faced with thick

blocks of cut and tooled stone, backed by rough-cut stone. In addition, the ground floor windows had molded architraves and bold rustication around the windows. This amounted to 514 lineal feet of stone walling, twelve feet in height and four feet thick, which required that almost three million pounds of stones be quarried, transported and worked by hand. Despite this impressive start, the most difficult and skilled part was yet to come, requiring a team of exceptionally talented stone carvers.

In their efforts to obtain from abroad the services of skilled craftsmen, the Commissioners authorized a Philadelphia merchant named George Walker, who was travelling abroad on business, to search for stonecutters in England and Scotland. In London, Walker published a broadside to attract craftsmen to the new Federal city. According to the broadside, the Commissioners were offering the prevailing rate for work and would pay the sea passage for stonecutters to come to America, even providing an advance to cover expenses while at sea. Single men were preferred, but the same travel arrangements applied to wives.

Walker's efforts met with no success in London, and he went on to Edinburgh some months later. This was a good time to recruit stone masons in Scotland; by 1793 a number of building projects had come to a halt due to the economic effect of Great Britain's entry into the European war.

In Edinburgh, Walker was successful in attracting an experienced builder and stone mason named John Williamson, who was perhaps related to Collen Williamson. In addition, six other members of the same masonic Lodge—Lodge No. 8—George Thompson, James White, Alexander Wilson, Alexander Scott, James McIntosh and Robert Brown—agreed to come to the Federal city in America and work on the White House. From 1794 until 1798, when their stone work ended, there were some 10 to 12 stonecutters working at the President's House. Other known stonecutters from the Federal pay records were Alexander Reid, James Reid, Andrew Shields and Hugh Sommerville.

Even with the enlarged work force, the stonecutters needed considerable assistance. Unlike other trades at the White House such as the carpenters, the Scotsmen objected to using slaves as hired help to assist them directly. Reluctantly obliged in this respect, the Scottish stone masons were allowed to follow tradition and took on white apprentices. The Scots were more flexible than English craftsmen, who were more stratified in their craft and specialties. In Scotland, stonecutters were also stone masons. This meant that Scottish stonecutters would also lay stone, which was of particular value in the labor short work force in America. With the additional skilled labor and apprentices now available to master mason Collen Williamson, work settled into something of a familiar but very busy routine consisting of 10 hour days, 6 days a week.

When the pieces of stone, ordered according to size and location for the White House, arrived in Washington, they were hauled over land to the large stone yard and sheds on the Presidential grounds, north and east of the present building. There, they were inspected for proper size and quality. Architect James Hoban estimated that one eighth of the stones from the quarry were not usable and had to be reordered.

While Hoban had designed the building, master mason Williamson worked out the details and figured how to actually build the structure. A complex maze of stone work was involved as well as a tremendous logistical effort. There were very few identical pieces of stone, and little opportunity to mass-produce similar pieces. Except for the ashlar, which were the plain rectangular blocks of stone between the windows, most stones were unique. On the south wall alone, approximately forty distinctly different kinds of architectural stone features needed to be cut: window sills, window architraves with moldings and ears, decorative consoles under the window sills of two different types, window pediments of two different types, carved support brackets under the pediments, projecting pilasters that varied in width from top to bottom, very elaborate pilaster capitals carved in the Ionic Order with scrolls, cabbage roses and leaves, a full classical entablature consisting of a molded architrave, hundreds of stone dentils and modillions, a crown molding, round balusters for the roof railing, and cap stones. These are just a few of the examples and some of the variations. Nor does this take into account the right hand/left hand variants; the special conditions that only occur at the corners; the curving

stonework that occurs on the south portico; or the special carvings on the other facades including ribbons and bows, oak leaves and garlands.

Every piece seemingly was pre-ordained for its place in the building. This was something that the master mason had to plan and manage independent of the architect, even though the architect was in charge of the entire operation and the two had to work together closely. Williamson made what are today called shop drawings, that spelled out details such as moldings and construction joinery, enabling the craftsmen to carry out the architect's concept. Using the architect's designs, Collen Williamson and his successor, George Blagden, submitted written estimates to the quarry, ordering the blocks of stone to be delivered to the stone carvers at the President's House. Their listings identified the necessary pieces of stone by name in priority order; the number of each piece and its length, breadth and height.

Tools, Logistics And Skill

The incredible variety of cutting and carving was done with about a dozen different tools, including an assortment of hammers, axes, picks, chisels and stone saws. In addition, there were levels, squares, straight edges and a great variety of special templates, plus the usual tools for mixing mortar.

The stone arrived from Aquia, Virginia with quarry-cut surfaces, a rough dressing of closely spaced pick marks evening out the surface irregularities from quarrying and splitting of the stone. Without further work at the job site, this quarry-cut surface was too rough to serve as the exposed face of any stones at

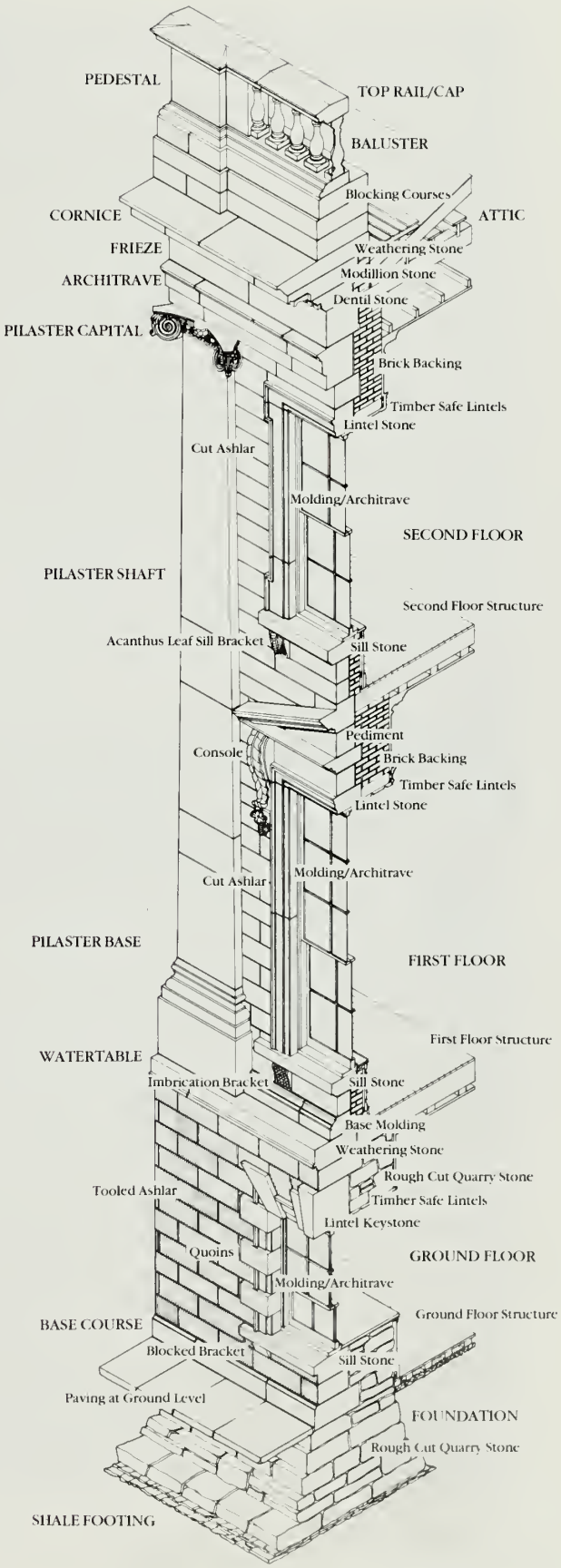


Fig. 3 *Partial section through the south wall of the White House showing the original stepped foundations and the solid stone walls for the ground floor. In an attempt to cut costs and expedite work after the project began, the upper walls were built of brick with a stone facing. Most of the dressed stone coursing is 12 inches in height and extends roughly a foot or more into the wall. Also seen are some of the carved stone embellishments, including the molded window architraves, several types of brackets under the window sills, the carved pediments and their supporting consoles, the pilaster capitals, the entablature with the projecting cornice and the roof balustrade. illustration: Tim Buehner, NPS.*

the White House, although it was suitable for use on the hidden or back surfaces and as foundation stones.

At the job site, many tasks were delegated to the helpers and apprentices such as sawing the ashlar wall stones, squaring them to size, and finishing the surfaces. Special work such as carving the moldings, balusters and the Ionic capitals was done by the stone carvers.

Each stone followed a forming sequence depending upon its use and placement in the building. Flat surfaces were usually created by sawing the stone, a tedious task indeed. The saw consisted of a large U-shaped wooden frame fitted with a thin toothless blade which was stretched between the two ends of the wooden frame, not unlike a modern coping saw. The toothless saw was drawn across the stone, while wet, sharp sand was placed between the blade and the stone (the cutting was thus an act of abrasion). In areas of the stone where a saw could not be used, flat surfaces were made with a hammer and a drove, a square-edged chisel about two or three inches wide. To make flat surfaces with such a tool required a good eye, a straight edge or template for shape, and a very controlled use of the hammer.

Once the stone was carved, the finish was applied. Some finishes added texture to the stone. For example, tooth-tooling produced parallel and closely spaced furrows used on the basement stones. Most of the stones on the upper walls had smooth surfaces, which were produced in several stages. After the face of the stone was hand-dressed or made flat with a chisel and checked with a straight edge, it was then honed to a smooth surface by rubbing the surface using a smaller flat stone with abrasive sand so that it would be both flat and smooth.

In addition to the variety of skills involved, heavy manual labor was involved in handling the stones during the cutting and carving process, and during the construction of the wall. At the White House there were two large wooden derricks about 50 feet high

Fig. 4 *The windows on the first floor of the White House have alternating triangular and arched pediments supported by large consoles. The second floor windows have* kneed *architraves (moldings) and acanthus leaf brackets supporting the sills. photo: Jack Boucher, HABS.*

Fig. 5 *The first floor windows on the north, east and west side walls have the band of interlocking circles (guilloche) beneath the sills, but only the windows on the east and west walls have imbrication brackets supporting them photo: Tim Buehner, NPS*

that undoubtedly were moved around the building as needed. These wooden derrick poles were similar to those at the quarry utilizing pulleys and rigging to help lift and place stones on the building walls. To lift the stones into place, a dovetailed rectangular slot, approximately 3 - 6 inches deep, had to be cut into the center of most stones. Commonly known today as a *lewis hole*, the cut was made in the top face of the stone. It permitted iron wedges on a hoisting ring to be fitted into the slot and held in place with a center spacer. After the stone was lifted up and installed in the wall, the iron wedges were removed. Then the hole was covered by the following course or in areas where it was exposed to weather, such as a window sill, it was partially filled with wood or hemp and sealed with mortar.

Installing the stones required considerable skill. Stones ranged in weight from about 300 pounds to over 3000 pounds, yet despite the difficulty of moving such stones into place, many of the stone joints are only about one sixteenth of an inch apart or less. There was little room for error in the cutting or fitting. Applied while seating the stones, the lime and sand mortar provided little more than a thin bed to keep the weather out of the joint.

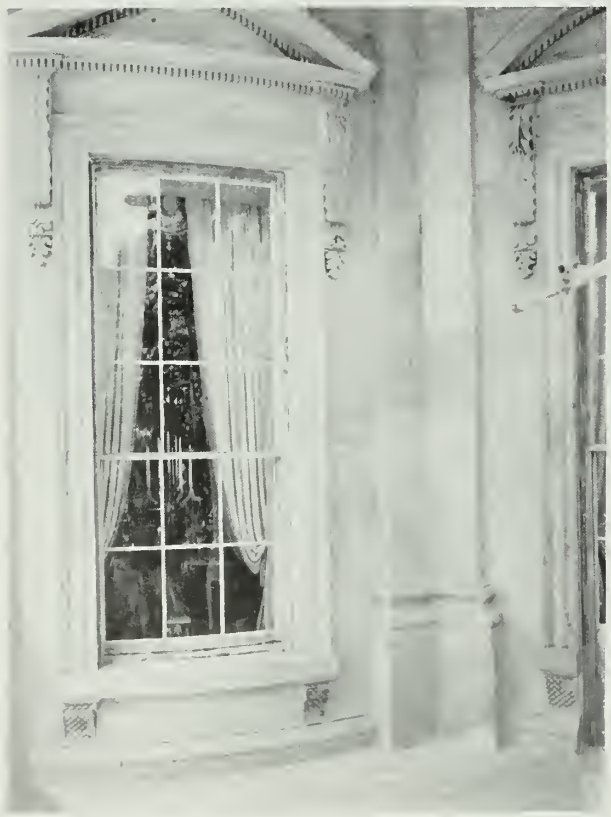


Fig. 6 *This view under the Truman Balcony on the south portico shows craftsmanship not found in any other windows on the building. The pediments, the architraves, the sills, and the base moldings are all curved to conform with the surface of the wall. These must have required a multiple set of wooden templates since each curved surface had a different radius that the stone carver had to follow. photo: Jack Boucher, HABS.*

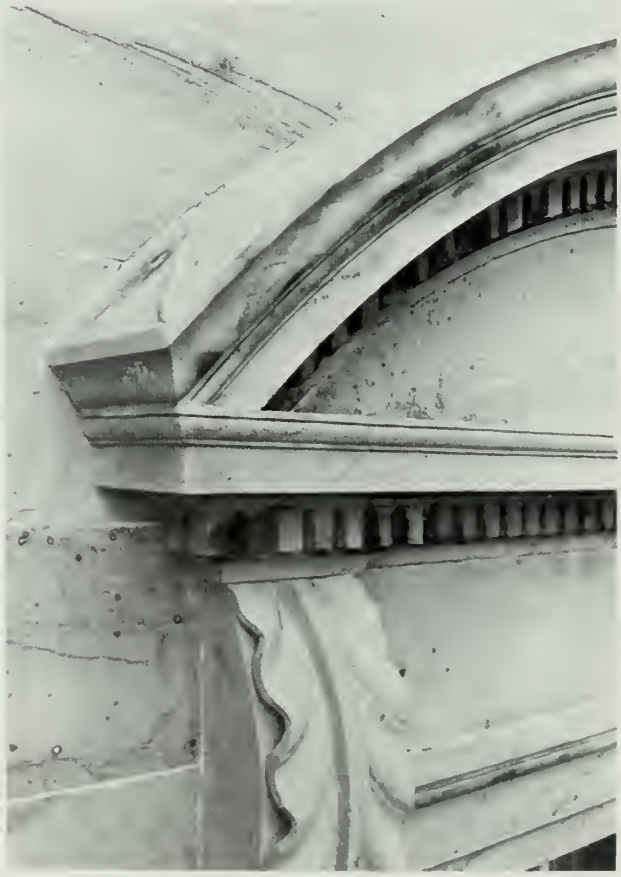
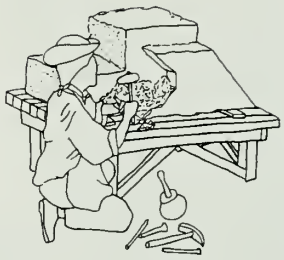


Fig. 7 *A built-in drip ledge on the top surface of a window pediment. The ledge is an integral part of the stone. This detail, not seen from the ground, diverts the rainwater washing down the top of the pediment away from the wall surface, thus reducing staining on the wall. photo: Jack Boucher, HABS.*

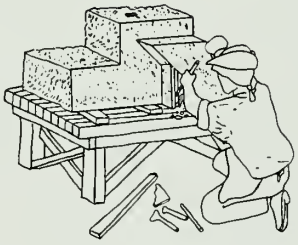
Fig. 8 *General view of the upper reaches of the White House at the southeast corner, showing the most concentrated array of stone carving on the building. It encompasses the pilaster capitals and the entire entablature with its architrave, dentils, modillions and overhanging cornice. All of this is topped with the stone balustrade composed of piers, round balusters, and top rail. Some of the individual pieces in the cornice weigh over 3000 pounds and rest over 50 feet above the ground. photo: Jack Boucher, HABS.*

9a

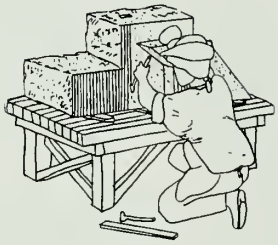
9b



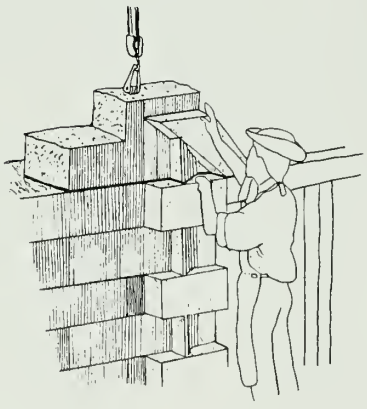
9c



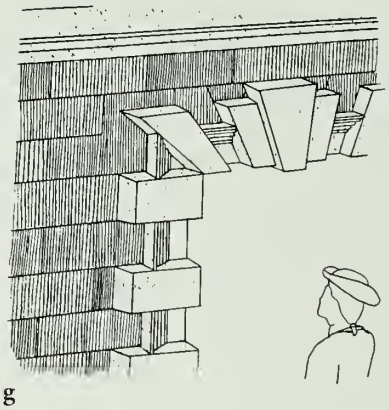
9d



9e



9f



9g

Fig. 9 *Steps in cutting and carving one stone, a typical lintel stone for a ground floor window of the White House. illustrations: Tim Buehner, NPS.*

a) The stone cutter laying out what will be a complex piece of work on a quarry block of stone. The small bumps on the edges of the stone are from the gaps between iron wedges used during the splitting process at the quarry.

b) A workman sawing out a corner. The angular cut at the right has already been made to fit the adjacent stone.

c) The stone being blocked out. Portions of the front face are being chiseled away to reveal the areas to be used for the quoins and architraves (moldings) around the window.

d) The carver is chiseling the moldings which are part of the window trim.

e) The carver is tooling the surface with a series of closely spaced furrows, a technique used only on the ground floor walls of the White House.

f) The finished stone is hoisted into place using a lewis, *iron wedges inserted into a fitted hole in the top surface of the stone.*

g) The stone is in place at the top left corner of a typical ground floor window. See Fig. 10 *for a photo of a complete window.*

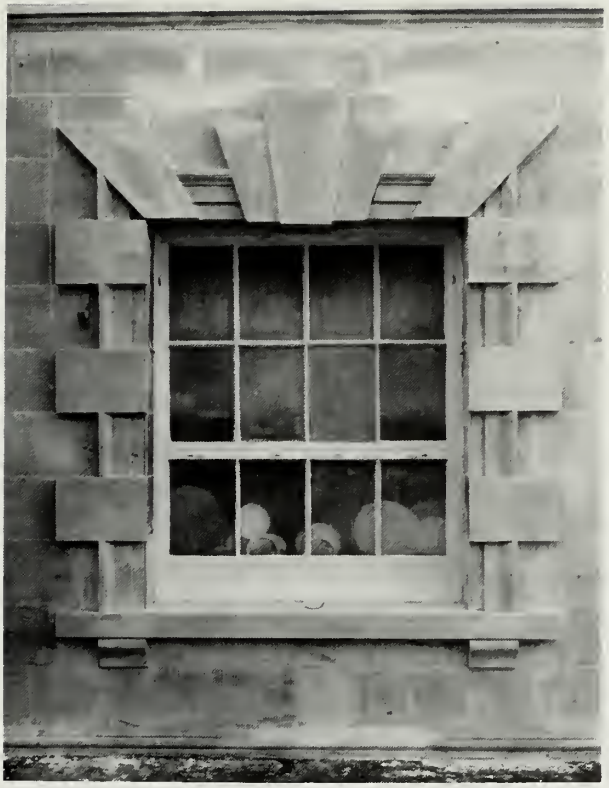


Fig. 10 *A typical window on the ground floor of the north wall. The complexities of carving one of the projecting voussoir stones around the windows are illustrated in* Fig. 9. *Note the tooled surface of the wall stones used on the ground floor, but not on the upper walls. The ground floor wall cannot be seen from Pennsylvania Avenue, but is visible on the south side because of the sloping ground. photo: Jack Boucher, HABS.*

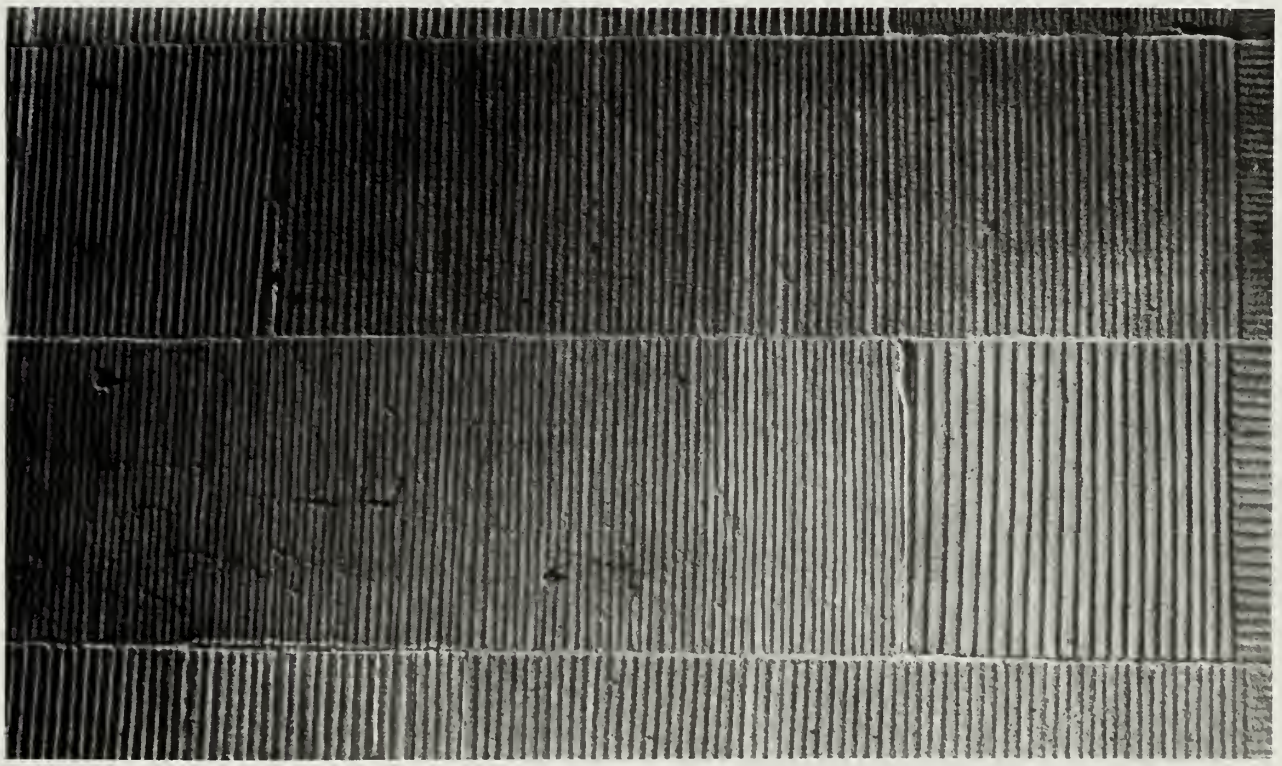


Fig. 11 *Close-up of the tooled surface on the ground floor wall. Each stone was tooled by a craftsman before the stone was placed in the wall. Variations in the spacing of both the vertical and horizontal tooling indicate that different craftsmen worked on the stones. photo: Jack Boucher, HABS.*

Flowers, Leaves And Ribbons Of Stone

The actual carving of the stone into delicate shapes such as flowers or leaves required the highest level of craftsmanship. While there are few views of such skills being performed in early America, the finished works of art remain. Their beauty and vigor are marvelled at and appreciated even after the effects of weathering for 200 years.

The carver needed to plan carefully and to visualize the finished product. There could be no mistakes. Before taking a tool in hand, the craftsman had to plan the approach to carving the pieces down to the most precise detail. As the unwanted stone was chiseled away, the delicate rose petals or other features were gradually revealed. This was sculpturing, a form of fine art in every respect. The delicate carvings executed at the White House are a tribute to the achievements and talent of the stone carvers. Largely unnoticed for the past 200 years, they are truly deserving of the recognition and appreciation given to exceptionally high levels of craftsmanship.

The more elaborate pieces of stone carving are comprised of designs well known to students of classical architecture—in the eighteenth century as well as today. These more elaborate details, some of which are illustrated here, include the following:

Guilloche: a chain of interlaced curves around a series of circular voids. Bands of guilloche appear under each window on the first floor of the north, east and west walls.

Imbrication: a pattern representing the overlapping of scales. This decoration is used on supporting brackets under the window sills of all the first floor windows except for those on the north facade.

Acanthus Leaf Brackets: carved brackets depicting acanthus leaves. They appear under the window sills on the north wall and the second floor windows of the south, east and west walls.

Console: a long carved bracket supporting the pediments of the first floor windows. The consoles are adorned with a long rolling acanthus leaf and a flowered quatrefoil supported by a label corbel or label stop of small acanthus leafs.

Fig. 12 *No known views of the original stone carvers working at the White House exist. In fact, there are very few contemporary views of any stone carvers at work on American buildings. This engraving was made from a drawing by the early American architect William Strickland (1788-1854). It shows a carver at work with his chisel, tooling furrows into a piece of stone, a craft technique used on the ground floor stone walls of the White House. Also seen here are the typical tools of the trade, including the carver's workbench, square, level, hammer, pick, straight edge, dividers, chisels, trowel and frame saw (on the ground at lower left). Also visible are typical specimens of the stone carver's art, including column capitals, bases, moldings, and mortuary work. Lawson Scrapbooks, courtesy Library of The Academy of Natural Sciences of Philadelphia.*

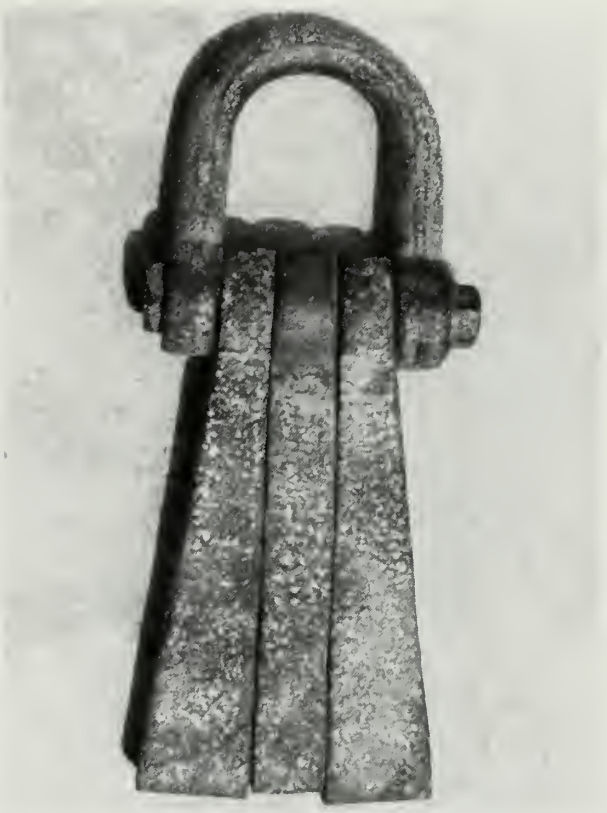


Fig. 13 A lewis, *a device used for lifting heavy blocks of stone. Though this one is modern, it is basically the same as those used throughout history. Stones had to be lifted onto the walls from the top so that rigging ropes would not get in the way when lowering the stone into place. To accomplish this, a three inch deep slot was chiseled into the top surface of the stone. The hole needed to be chiseled like a dovetail, that is, wider at the bottom than at the top. To install the lewis, the two outer wedge shaped irons were first put into the hole; the middle spacer was inserted, and then the bolt or iron pin was reinstalled, locking it in place. Once the lewis was secured, a rope could be attached for hoisting. The pressure of the iron wedges against the tapered hole kept the* lewis *from coming out. photo: Tim Buehner, NPS.*

Fig. 14 *Brackets and guilloche (the chain of interlaced curves and circles) under the first floor window sills on the north wall. photo: Jack Boucher, HABS.*

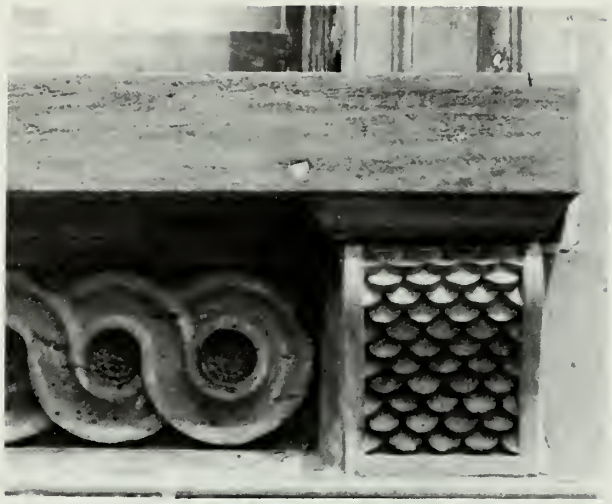


Fig. 15 *Detail in the stone brackets supporting the first floor window sills on the south, east and west sides. The pattern, known as imbrication, resembles overlapping scales. photo: Tim Buehner, NPS.*

Griffins: mythical creatures resembling winged lions. Two are centered in the inner arch of acanthus leaves over the north entrance doorway.

Ionic Capitals: column or pilaster capitals (or tops) decorated with scrolls, cabbage roses, eggs and darts, and acanthus leaves. They are used atop all pilasters and columns. In the center of the capital, the rose petals are the highest relief carvings on the entire building. Tilted toward the ground to give the casual observer a three-dimensional view, the boldness and complexity of these carvings are barely apparent from the ground.

Ornament was not just limited to classical architectural features. Common items became subjects for permanent decoration on the White House and

Fig. 16 *A carved bracket under one of the second floor window sills. There are 64 brackets of this design on the White House, and while it might be assumed that they are all identical, each is slightly different, individually carved by hand and inserted into the wall. Since the bracket and the wall stone are one unit, a large amount of stone had to be carved away to make the flat surface behind the projecting bracket. photo: Tim Buehner, NPS.*

Fig. 17 *A typical carved console supporting the first floor window pediments. Note the carved stone moldings that are part of the architraves enframing the windows. photo: Tim Buehner, NPS.*

Fig. 18 *Ionic capital for one of the pilasters, typical of those on the south, east and west walls of the White House. These capitals cannot be fully appreciated from the ground, but they exhibit delicately turned volutes, acanthus leaves, egg and dart moldings and finely detailed cabbage roses, canted downward toward the viewer on the ground. Compare these wavy rose petals with the plainly carved petals in the capitals of the later columns on the 1820s north portico* (fig. 19). *photo: Tim Buebner, NPS.*

Fig. 19 *Ionic capitals on the columns of the north portico, an addition constructed in 1829-30. Compare how the rose petals are arrayed in smooth concentric curves, as opposed to the more naturalistic petals on the original pilaster capitals carved in the 1790s* (fig. 18). *photo: Richard Cheek.*

Fig. 20 *General view of the large lunette window and Palladian entry centered on the west wall. The central portions of the east and west walls were damaged beyond repair during the burning of the White House by the British in 1814, and were rebuilt in 1816 under the direction of the original architect, James Hoban. The stone details in these sections are believed to match the original construction. The lunette window is framed in stone with a* kneed *molding, a large scrolled keystone with a projecting acanthus leaf, and large acanthus leaf brackets supporting the window sill. The band of small rosettes around the inner window were originally carved in wood, but were later replaced with cast lead replicas. photos: Tim Buebner, NPS.*

Fig. 21 *Nowhere on the White House is the richness of the stone carving more evident than over the north (front) doorway. The enframement includes consoles, engaged columns, and arbes ornamented with a mixture of oak leaves, acanthus leaves, medallions, and griffins. Above the entrance are high relief carvings of ribbons, bows, and swags of oak leaves and acorns accented with roses. photo: Jack Boucher, HABS.*

made the mansion more American. These applications, include the following:

Oak Leaves and Acorns: features from the great American forests were intertwined in the outer archway band over the north entrance doorway. They are also seen on the brackets framing the door.

Ribbons, Bows and Swags: festive items of celebration. Two swags festooned with ribbons, two bows, two large roses, hanging bell-flowers, oak leaves, and a central medallion are a major ornamental motif over the main north entrance doorway.

Additional carvings were made for the door and window architraves, and considerable time was required in constructing the building entablature and the extended roof cornice, which had over 300 large stone balusters carved in the round by hand. The richness of detail and the fine quality in the carving was an outward expression of the symbolic importance attached to the President's House. Along with the United States Capitol, it was truly the finest stonework in the new nation.

They Left Their Mark

Pride, craft and self-identity have long been inextricably intertwined. Stonecutters were no exception. Mason's marks, geometric designs composed of triangles, X's, arrows, and lines, were carved into the stone to identify the work of the individual craftsman. Generically called banker's marks because similar symbols were widely used by merchants to identify goods and products, their use can be traced back to the Middle Ages. Whether on churches, palaces or fortifications, mason's marks are commonly found on early stone buildings in Europe. In America, they appeared on buildings and

Fig. 22 *Many layers of paint had obscured the quality of the carvings around the north doorway until this area was stripped of its paint in 1984. photo: Richard Cheek.*

Fig. 23 *Typical carved stone balustrade of the White House. Many of the original sandstone balusters have been replaced over the years (mainly with Indiana limestone), as their extreme exposure makes them susceptible to damage. photo: Tim Buehner, NPS.*

engineering works until about the 1840s, when their use declined.

In eighteenth century Scotland and England, operative or working stone masons granted a mark to apprentices upon completion of their training as a symbol of the knowledge and worth of the new mason. In many cases, the granted mark was a variation of the teacher's or master mason's design, providing a history and background to the future employer. Registered and protected by the mason's guilds or lodges, the symbol became the individual's identity. The marks served a practical purpose when the extent and complexity of the work were measured to determine the costs to the owner, based upon certain rules, that is, the specific charges for different kinds of stone work.

Over 40 characters have been found and recorded during periods of renovation and alteration at the White House. These marks are the signatures of stone masons who worked on the White House during the 1790s, as well as the partial rebuilding after the 1814 fire, and during the addition of the north and south porticoes in the 1820s.

Most of the White House mason's marks are neatly carved on the back or hidden surfaces of the building stones, unseen until the stones were removed during alterations, or restoration work. During the extensive renovation of the Executive Mansion in the 1950s, many mason's marks were discovered and the stones removed. Some were distributed by President Truman to state and other Masonic Lodges in North America, while a number of the stones were retained and the marks displayed in two reconstructed fireplaces on the ground floor of the White House.

Looking at the White House mason's marks is perhaps the closest we can come to identifying with the person who carved the handsomely skilled stonework. It was his signature, his claim to fame.

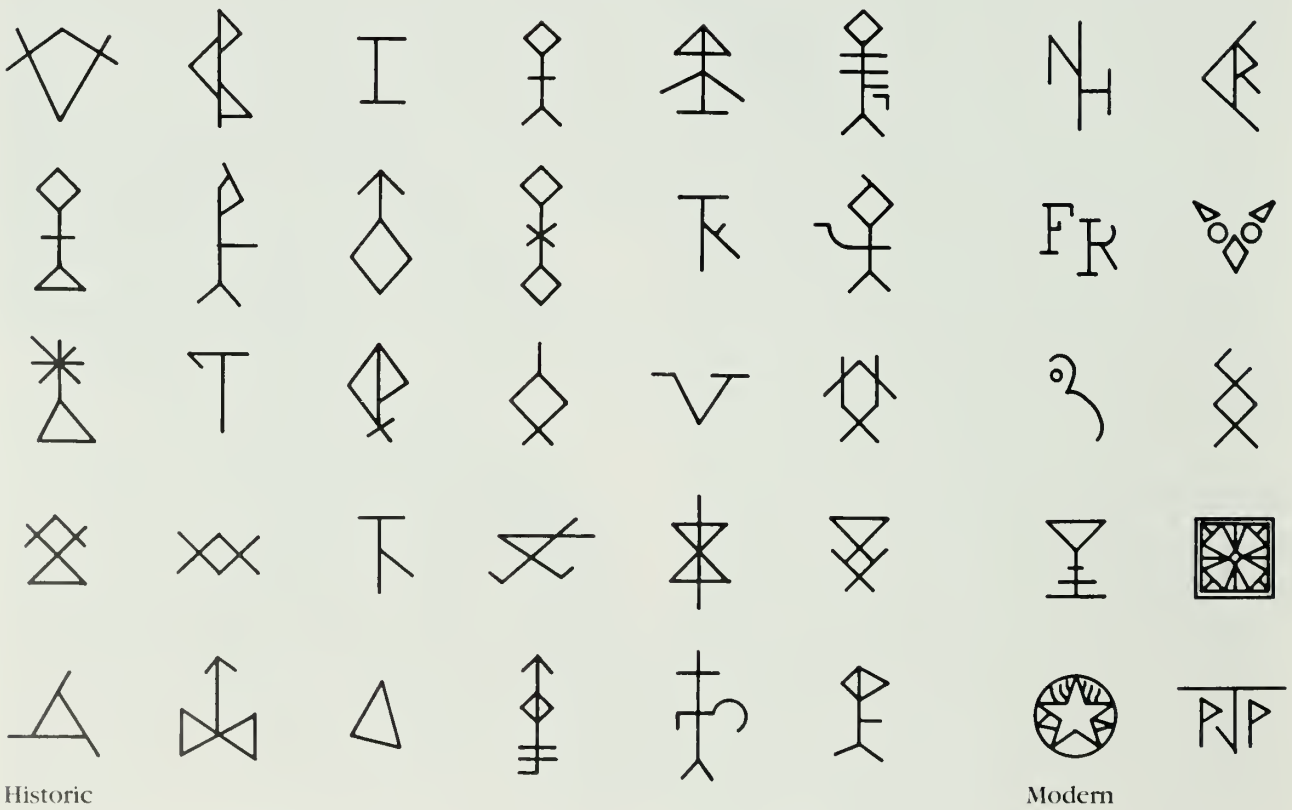


Fig. 24 *Examples of the mason's marks found upon the various stones at the White House during the renovation and restoration work. Over 40 marks have been found. It has not been possible to date or link any of these marks with stonecarvers known to have worked on the building in the 1790s. Carvers working on recent restoration have left their own marks. illustration: Tim Buehner, NPS.*

Fig. 25 *One of the major cracks in the entablature of the south wall. This view also shows the results of environmental damage where the protected stone dentils absorbed airborne pollutants that could not be washed off by rainwater. Over the past 200 years, many of the dentils have been destroyed or damaged in this way. photo: Bill Allman, Office of the Curator, The White House.*

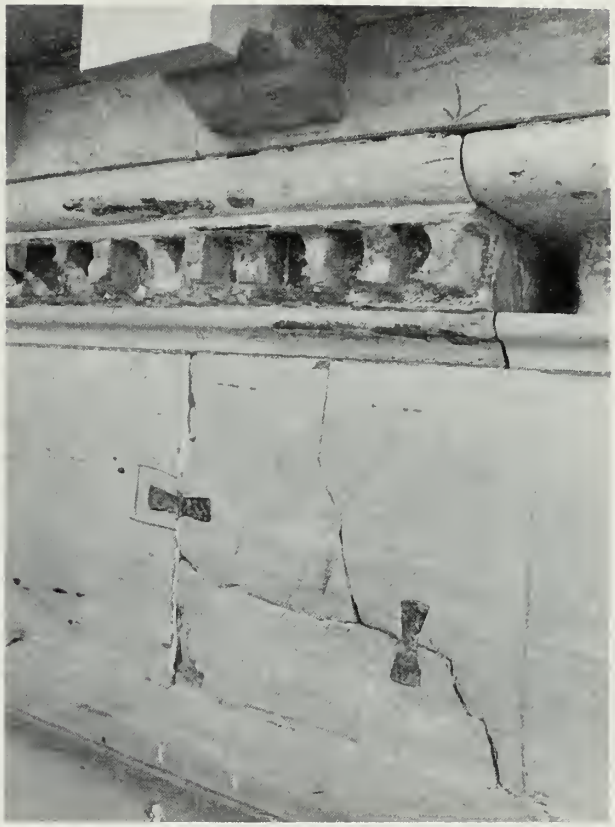


Fig. 26 *Close-up of the entablature, just below the cornice. In the frieze area, a pair of cracks were repaired (probably at an early date) with iron cramps. The iron cramps extend into the face of the stone at each end to hold the stones together and keep the loose pieces from falling out. Also note the extensive erosion of the dentils. photo: Bill Allman, Office of the Curator, The White House.*

Fig. 27 *Aquia stone that was removed from the U.S. Capitol during the extension of the East front in the 1950s and put into government storage. Some of this stone is now being used for the restoration of the exterior stonework on the White House. photo: Tim Buehner, NPS.*

Fig. 28 *Patrick Plunkett, stone superintendent working on the White House restoration, is shown operating the large circular saw used for rough cutting the old stone blocks salvaged from the Capitol. photo: Tim Buehner, NPS.*

Fig. 29 *While most of the restoration involved repairs due to poor original stones or environmental damage, some of the work was to correct damage from previous alterations. This restoration stone cutter is seen fitting in a new piece of stone to correct damage below the base molding on the south portico. Such work is done with very tight tolerances, and often will be unnoticed when the work is through. photo: Jack Boucher, HABS.*

Fig. 30 *Most of the stone repairs were small and made in place. Working from scaffolding, the stone cutters employed air-powered chisels to cut away the damaged portions. Replacements were then made slightly oversized on the outer face so that it could be trimmed to make a flush fit with the adjacent stonework after it had been set in place. photo: Tim Buehner, NPS.*

Fig. 31 *Many of the repairs to the old stonework were necessitated by the damage from earlier metal attachments for lighting, railings, shutters, and electrical devices. Often the removal of such attachments left unsightly holes and in some cases the rusting metal cracked the stonework. The stonecutters are inserting new pieces of stone at the points of damage. photo: Lee Nelson.*

200 YEARS LATER STONEWORK RESTORATION

The Aquia stone used at the White House is generally considered an inferior building stone because of its relative softness, abundant flaws, and poor weathering ability. Yet part of the perceived problems with the stone can be attributed to the poor quality control at the quarry. Some Aquia stones still can be found in very good condition today, including various local tombstones from the late 1600s and the 1840s facade of the Patent Office Building in Washington, D.C. The White House stonework actually has weathered rather well; from the beginning the stonework was whitewashed to seal it against water damage and to make it more uniform in color. (It is an erroneous belief that the White House stone was first painted to hide the fire damage from the British burning of the building in 1814.)

Throughout most of the nineteenth and twentieth centuries, the White House received periodic coats of paint for maintenance or to provide a fresh clean look, often timed for the arrival of an incoming President. Because the White House has been repainted with regularity, the stone work has not shown its age to the casual observer. However, over the years a host of problems related to the effects of time and weather developed under the heavy paint built-up, from cracks in the old walls to rusting metal attachments in the stone. Paint build-up has also obscured conditions such as damage from the 1814 fire and problems connected with earlier repairs to the masonry.

The paint itself caused maintenance problems. With such a heavy build-up of paint, constant peeling necessitated even more frequent repainting. By the mid 1970s, it was clear that something had to be done to the stone of the White House in order to re-establish a sound surface for repainting. This would be a major project given the size of the building, the thickness of the paint and the knowledge that most of the paint had a lead base, which would require care in its removal and disposal. Moreover, the White House would be in constant use during this time as the home and office of the President and stage for world events.

At the request of the White House Chief Usher, the National Park Service and the National Institute of Standards and Technology, formerly National Bureau of Standards, developed a methodology for removing the paint that could be accomplished without damaging the surface and details of the historic stonework. Since removal of the paint would require complete scaffolding of the building with consequent disruption to the access and use of the building, the decision was made to do the work in stages over a period of years.

Work commenced in 1980 with the removal of more than 30 layers of paint from the east elevation. During the paint removal, it became evident that repair and maintenance problems with the stone had been hidden for many years. Paint removal exposed several categories of problems relating to the historic stonework:

1). Cracks in the stone, some of which were caused by age and movement of the walls, while others were probably hairline cracks in the original stone—unnoticed when the stones were first laid into the walls. These cracks allowed moisture to penetrate the wall;

2). Exfoliation and erosion of the surfaces and exposed edges of the stone, especially where they were frequently wetted by rain;

3). The majority of the dentils and many of the modillions had been seriously eroded and previously covered with sheet metal, that imitated their architectural form;

4). Spalling, or peeling away of the outer layers of the stone surface;

5). Failed cement patches in the stone from earlier repairs. When high strength cement became available in the nineteenth century, it was used for patchwork. It was not understood that the cement patches were often stronger than the stone. The stone thus became overstressed, and failed at the interface with the cement; and

6). A variety of stone failure problems caused by the early use of iron bolts and iron cramps which had been used to hold the stones together at certain joints. Unfortunately, early craftsmen did not understand that rusting iron causes an expansive force that puts pressure

on the stone and eventually causes it to crack or split. The iron parts that caused such problems must eventually be replaced.

The philosophy or guiding principle for the restoration of the historic stonework is to return the building to a sound condition while preserving as much of the historic fabric as possible. This means replacing only damaged portions of individual stones in most instances—not replacing entire stones or sections of the walls. This work is more like dental fillings than new teeth. The overriding concern is to retain as much of the historic stonework as possible, whether elaborately carved or simple wall blocks.

Besides preserving the historic stones, the work is intended to preserve the walls' historic character, which includes the original craftsmanship reflected in the tool marks, the surface finishes, and carved details. To help realize this goal, a substantial amount of the repair and restoration of the historic stonework is being done by hand, using traditional techniques and materials.

Consistent with the high standards set for the project was the desire to match the appearance and material characteristics of the original Aquia stone. This was considered important even though the stone would subsequently be repainted. (It is, after all, the White House.) Unfortunately the few quarries producing Aquia stone for architectural use had been closed for over a century.

Fortunately, there was a supply of old Aquia stone quarried at the same time as the White House sandstone and available for use. When the east front

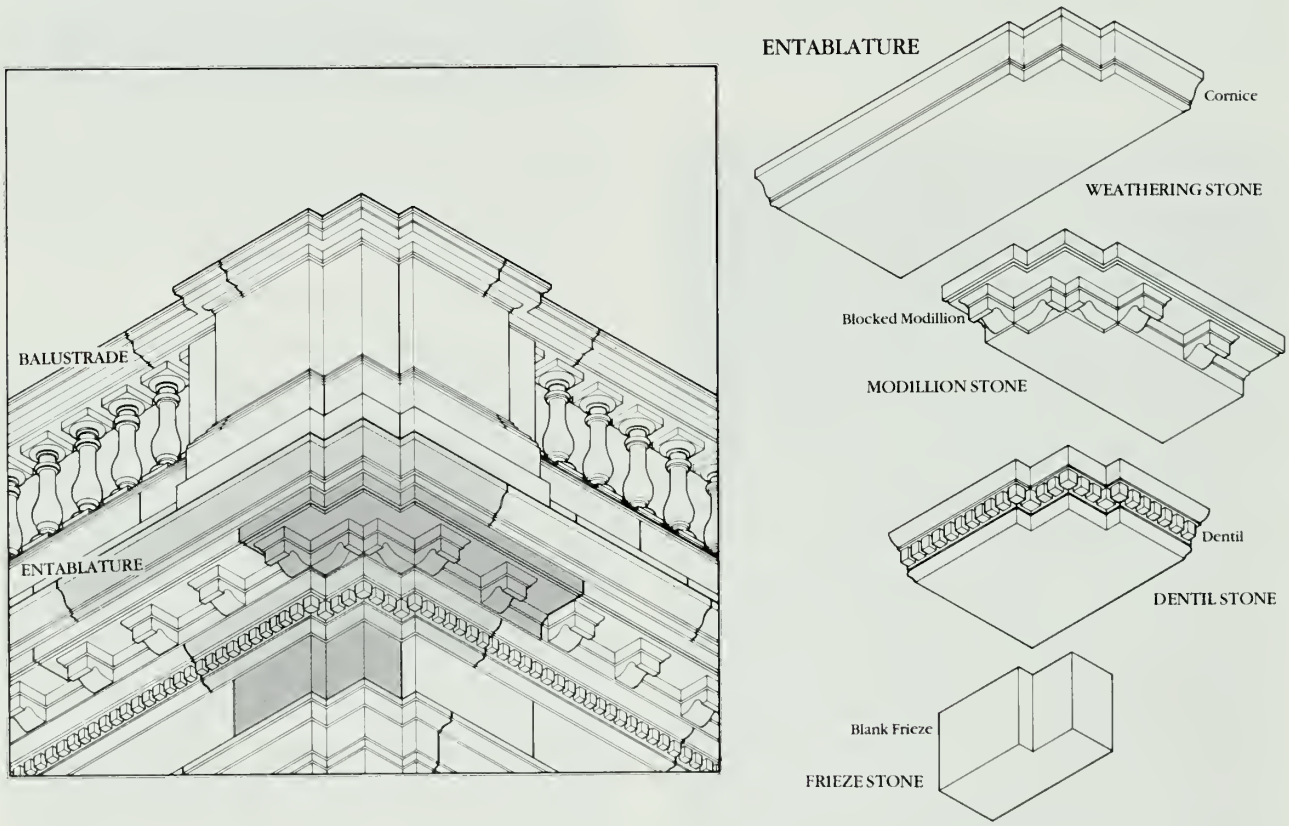


Fig. 32 *Isometric drawing looking up at the entablature and roof balustrade of the southwest corner of the White House. A serious crack extending through several layers of stone in the entablature was discovered during the present restoration. While this situation required analysis and repair, it also provided the opportunity to study some of the original construction details. This area is complicated, partly because the stones at the corner have architectural features on both faces of the building, and partly because there are five layers of large stones that comprise the entablature: the weathering stone creating the cornice, the modillion stone, the dentil stone, the blank frieze, and the architrave. The details of four of these stones are drawn off to the side, and show how the original stone carvers planned and executed the overlapping stones to carry the projecting weight. The weathering stone, the upper stone, weighs over 3000 pounds. illustration: Tim Buehner, NPS.*

of the United States Capitol was extended in the late 1950s, large quantities of the original stone were removed and saved by the U. S. Congress. Later, the White House Chief Usher, Gary J. Walters, worked with the Architect of the Capitol, George M. White, to obtain approval from the two controlling Congressional committees to utilize the stone in restoring the exterior of the White House.

This emphasis on preservation has had the strong support of the First Families who have lived amidst the scaffolding, dust and noise of the lengthy exterior restoration. The use of traditional methods and the required level of high craftsmanship necessitated a long process of preservation and repair.

The availability of Aquia stone quarried in the eighteenth century was fortuitous for the White House, as was the local presence of a cadre of stone carvers trained during the decades-long building of the Washington National Cathedral. Starting in the 1980s, their skills were used at the White House, first through a construction contract, and then by the White House Chief Usher employing a small group of stone carvers.

Some modern technology has been utilized by the carvers in restoring the historic stonework. Compressed air tools has replaced the hammer, and the chisel points have carbide tips, which save enormous amounts of time in keeping the chisels sharp. Some modern machinery has also been used, including a large platform-mounted stone-cutting circular saw for cutting the blocks of the *new* stone to the approximate size, and lathes for turning stones into circular shapes for the roof balustrades. In the latter instance, the precise mechanical lathes are saving considerable time, since many of the historic balusters have been damaged beyond repair, unlike most of the other stonework, due in part to high weather exposure, storm damage and flaws in original balusters and various replacements.

Fig. 33 *A stonecutter is chiseling furrows, called tooling, into the new stonework. Only the ground floor walls of the White House have tooled surfaces as opposed to the smooth upper walls which have dressed stone faces. During the repair work, the new tooling is made to match the texture of the adjacent original stonework. photo: Patrick Plunkett.*

a

b

Fig. 34 *(a, b) The most serious damage to the original stonework was at the upper southwest corner of the White House where four very large stones had broken early in the history of the building and had been repaired with large iron bolts. The iron bolts rusted over time causing secondary damage. It was necessary to remove the damaged portions of the stone and replace them with new stones. These two views show one of the broken stones being removed and its replacement being carved in the shop on the White House grounds.* (See fig. 32 *for a detail of the four stones that were replaced.) photo: Tim Buehner, NPS.*

Since preserving historic fabric is the guiding principle in this project, only the damaged portions of the original stone are being cut away and replaced. Thus, the cracked portions of the stones are cut away and filled with new pieces of old Aquia stone selected to match the original in texture and bedding planes.

The carving of stone repairs and stone replacement pieces is somewhat different from the carving of the original stones. The work today is primarily cutting away the bad and filling with good stone. The damaged parts are chiseled away, usually into a neat rectangular recess or cavity. Then a new piece of stone is mechanically cut slightly oversized, based on the same principle as at the original quarries when filling the orders for specific stones for the White House. In the small stone-carver's workshop, temporarily

Fig. 35 *During the present restoration, many modillions (and dentils) were found to have sheet metal covers screwed to the stone. These later covers concealed the underlying deterioration. Subsequent layers of paint had hidden these makeshift repairs. photo: Bill Allman, Office of the Curator, The White House.*

constructed adjacent to the White House, one of the stone carvers then cuts the piece down to the exact size of the cavity—with one exception. The carver usually allows the new stone piece to project slightly beyond the surface of the wall until after it is mortared into place. Then the projecting surface is chiseled away, thus assuring a perfectly flush repair.

Different techniques are used depending on the type of stonework involved. On the ground or lowest floor the original stones had a tooled or furrowed surface, achieved by cutting a series of very narrow grooves into the surface of the stone. Today when making repairs, the damaged portion of the stone block is first cut away. Then the replacement piece is set in and tooled the same original way to ensure similar tool marks. The work is done by hand after the new stone is installed, so as to match the original craftsmanship of the adjacent portion of the original stone. In many respects this type of restoration work is essentially a process of working backwards to match the historic character, rather than creating a new character for the building.

In addition to the balustrade, the portions of the building that have suffered the most from the elements are the architectural features under the main cornice, especially the modillions and the dentils. These features are under the overhang of the main cornice and they receive some protection from the weather.

Fig. 36 *A typical mason's* mark *on a White House stone. Such marks were usually chiseled into an unexposed face of the stone to identify the mason's work. Sometimes there are several such marks on a stone, thus indicating that two carvers worked on it—perhaps a master stone carver and an apprentice. Traditionally, a mark was given to a carver upon completion of his apprenticeship, but some of the apprentices at the White House may have taken on their own identifying marks photo: Bill Allman, Office of the Curator, the White House.*

However, since they are not regularly washed by rain water like the plain wall surfaces, the modillions and dentils tend to retain airborne dirt and pollutants, which then chemically degrade and erode those features, despite frequent painting.

The paint removal and stone restoration have led to interesting discoveries. Some of these discoveries relate to learning how areas of the original stonework features were assembled from a complex series of interlocking blocks. Through the restoration, a much greater understanding is being achieved as to what was involved in creating the many different architectural features. As a result, the appreciation and respect for the skills of those originally involved in planning and building the White House has been greatly enhanced.

Discoveries have continued during the project. The restoration efforts have revealed how when the original stone dentils under the cornice became seriously eroded many years ago, they were simply covered over with sheet metal imitations screwed to the stonework. After many coats of paint they were not readily detectable until the paint was subsequently removed. However, the sheet metal made a poor repair job, allowing moisture to continue eroding the covered stone. Removal of the sheet metal and repairs to the stone were necessary.

Perhaps the most exciting finds have occurred in the few instances when the removal of a large damaged stone revealed the chiseled identifying mark of the original stone carvers on the back side. To today's stone carvers, such a find has generated the

Fig. 37 *This view of one of the pilaster capitals on the south wall (with paint removed) shows that the stone carving has weathered rather well. However, there are a number of flaws in the stone, such as small cracks and holes, which have allowed water penetration, thus causing pieces of stone to fall or erode away. This capital required restoration of the right volute. The shaded area shows the portion of the damaged capital that was replaced in 1990. photo: Lee Nelson.*

special feeling of coming face-to-face with one of the original craftsmen.

Revealing the original stonework for the first time in 200 years has inspired a new interest in the building, its design, its craftsmanship, and its architectural history. For the first time there has been a careful architectural recording of the building with photogrammetry and measured drawings, carried out through the efforts of the National Park Service, Historic American Buildings Survey, and the staff of the Executive Residence at the White House.

The restoration is returning the stonework to a sound condition while preserving most of its historic material. To help guide future maintenance and research, a careful record is being made of the restoration work. While all materials deteriorate over time, regular maintenance and sensitive historic preservation practices will enable the White House to remain for many future generations both a tangible symbol of our democracy and a testament to the richness of our architectural heritage.

Brief List of Further Reading

McKee, Harley J., *Introduction to Early American Masonry, Stone, Brick, Mortar and Plaster*, published by the National Trust for Historic Preservation and Columbia University, Washington, D.C., 1973.

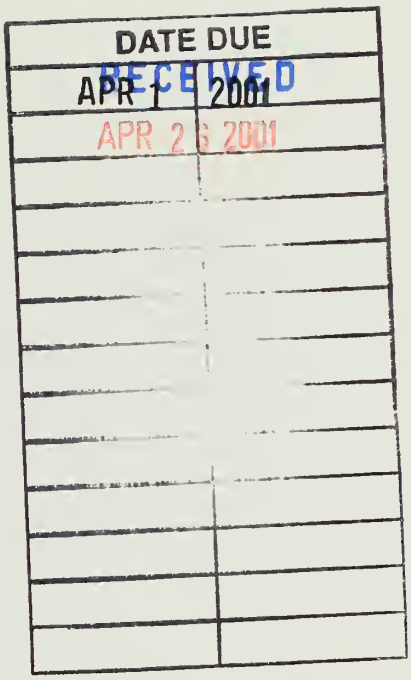
Report of the Commission on the Renovation of the Executive Mansion, Washington, D. C., U. S. Government Printing Office, 1952.

Seale, William, *The President's House, A History*, published by the White House Historical Association, Washington, D.C., 1986.

Seale, William, *The White House: The History of an American Idea*, published by the American Institute of Architects Press, Washington, D.C., 1992.

Withington, Charles F., *Building Stones of Our Nation's Capital*, published by the U. S. Geological Survey, U. S. Department of the Interior, Washington, D. C., 1981.

Clemson University
3 1604 012 017 580



ISBN 0-16-038014-6
90000
9 780160 380143